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Urban Intelligence

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Abstract

A smart city can be seen as a urban space that takes advantage of information and communication technologies and data science to answer todays challenges, namely to become more efficient in services and infrastructures management and to deliver increased quality of life to the people who lives, works or visits the city, not forgetting the support to fight climate change.

In this framework cities governments are nowadays under pressure and going through a digital transformation process that is translated in the proliferation of "Smart Cities" initiatives around the world as part of the strategic response to the challenges and opportunities of growing urbanization and climate change altogether with the emergence of cities as a space for social and economic development .

In this work we will propose a concept of urban intelligence and its building blocks that result from the city digital transformation process which will lead to a paradigm shift leading to the city as a platform where urban planning and management is supported by urban analytics and real time data.

Keywords: urban intelligence; smart cities; city as a platform; digital transformation

1. INTRODUCTION

Although we can find in the literature many “Smart City” definitions, we can say they all share the idea that a smart city is a urban space that takes advantage of information and communication technologies and data science to answer todays challenges, namely to become more efficient in services and infrastructures management and to deliver increased quality of life to the people who lives, works or visits the city, not forgetting the support to fight climate change.

In fact today 50% of the world population lives in urban areas, a process of urbanization which tends to accelerate - estimating a population growth of 7 to 9 billion by 2050, which will represent 75% of the global population. Thus, although cities occupy only 2% of the earth land surface, are responsible for the production of 80% of global GDP and consume 75% of natural resources, produce 50% of global waste and emit 60-80% of greenhouse gases (UNEP, 2017) .

In this framework cities governments are nowadays under pressure and going through a digital transformation process to support higher efficiency resource usage that is translated in the proliferation of "Smart Cities" initiatives around the world as part of the strategic response to the challenges and opportunities of growing urbanization and climate change altogether with the emergence of cities as a space for social and economic development.

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In this work we will propose a concept of urban intelligence that results from a digital transformation process which will lead to a paradigm shift where the city can be seen as a platform. In this city as a platform intelligent urban planning and management is supported by urban analytics and real time data. Furthermore, we will characterize what we believe are today the urban intelligence building blocks.

2. SMART CITIES

2.1. Smart City Definition

The concept of smart city, although not recent, remains diffuse and quite heterogeneous . In general terms, it can be said that an smart city is a connected, knowledgeable and optimized urban space where the local administration uses information technologies to provide services and manage infrastructures, reducing costs, increasing security, and attracting investments, in a sustainable and resilient way, improving the quality of life of those who live, work or visit it.

DEFINITION	SOURCE
Smart city as a high-tech intensive and advanced city that connects people, information and city elements using new technologies in order to create a sustainable, greener city, competitive and innovative commerce, and an increased life quality.	Bakıcı et al. (2012)
A smart city is based on intelligent exchanges of information that flow between its many different subsystems. This flow of information is analyzed and translated into citizen and commercial services. The city will act on this information flow to make its wider ecosystem more resource efficient and sustainable. The information exchange is based on a smart governance operating framework designed to make cities sustainable.	Gartner (2011)
Smart city generally refers to the search and identification of intelligent solutions which allow modern cities to enhance the quality of the services provided to aware citizens.	Giffinger et al. (2007)
Smart Cities initiatives try to improve urban performance by using data, information and information technologies (IT) to provide more efficient services to citizens, to monitor and optimize existing infrastructure, to increase collaboration among different economic actors, and to encourage innovative business models in both the private and public sectors.	Marsal-Llacuna et al. (2014)
The idea of a smart city is rooted in the creation and connection of human capital, social capital and information and communication technology (ICT) infrastructure in order to generate greater and more sustainable economic development and better quality of life.	Manville et al. (2014)
Cities [should be seen as] systems of systems, and that there are emerging opportunities to introduce digital nervous systems, intelligent responsiveness, and optimization at every level of system integration.	MIT (2013)

Table 1: Smart city definitions
(Fernandes, 2017)

Although the term has been gaining more popularity in the last two decades, to define what is a smart city is still a complicated task. There is neither a single definition to frame the concept smart city

nor a one-size-fits-all definition (Albino, Berardi, & Dangelico, 2015), as we can see in the table above which reports some of the different meanings given to the concept by some authors.

In a more holistic perspective ISO (2014) defines intelligent city as one that can be described as a city that:

- It dramatically increases the pace of its sustainability and resilience;
- Fundamentally by improving (i) how it involves society, (ii) how it uses collaborative leadership methods, (iii) how it works across disciplinary areas and city systems, and (iv) how it uses integrated data and technology;
- With a view to transforming services and quality of life for those who are in the city and for those who are involved with the city (who lives, who works and who visits).

The smart city results from the answer to the challenges posed by two megatrends: urbanization and digital revolution. Thus, we can define an smart city as an interaction between technological innovation, organizational innovation and political innovation (Alawadhi et al, 2012).

With the objective of unifying and reach a consensus Anthopoulos, Janssen & Weerakkody (2016) carried out a study where various smart cities models already proposed were analysed. The result was a unified smart city model that is composed by six dimensions that are recognized an agreed by many scholars, even with small variations. The six axes are: Smart Economy; Smart Mobility; Smart Environment; Smart People; Smart Living; and Smart Governance.

According to Khatoun and Zeadally (2016), the most widely adopted smart city reference model includes the six above referred dimensions, placing the citizen as the center of all the axes once they exist to meet their needs, as shown below.

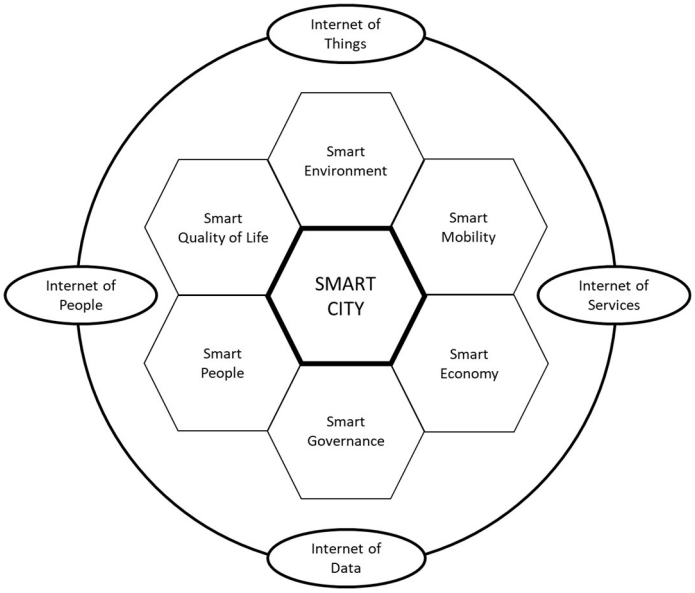

Figure 1: Intelligent City Model (Khatoun and Zeadally, 2016)

In order to support the model of intelligent city presented, these authors defended it needs to be based on the following five components:

- **Broadband infrastructure** – a fundamental infrastructure that provides connectivity to citizens, businesses and organizations;
- **Electronic services** - involving ICT use to provide city services, including sales, delivery, and customer support;
- **Public Open Data** - means that the data can be freely used, reused and distributed by any person or entity;
- **Sustainable Infrastructures** - implies responding to the challenge of building and maintaining infrastructures in the city that are both socially, environmentally and economically sustainable;
- **Electronic Governance** - supporting the governance performance using electronic means to facilitate an efficient, rapid and transparent process of dissemination of information to the public and also to carry out administrative activities.

Concluding, we can say that the different smart city definitions share the idea that the growing sensing capabilities induced by the technology and connectivity evolution will play a major role in the process.

Altogether, the potential that the technologies today offer to collect huge amounts of data, launches the challenge of being created analytical capabilities and made available the necessary skills to promote their conversion into information and thus of value to the decision making process, to the creation of new products and services, and for more active and engaged citizenship.

According to the Strategic Policy Forum on Digital Entrepreneurship (2016), digital transformation doesn't only enable economic growth, but also the improvement of the quality of life for all citizens. Nevertheless it is fundamental to take into consideration the strategic role of cities and regions in leading a modern, smart transformation of their territories and the importance of a holistic approach, including a multitude of actors, in order to grasp all the digital opportunities offered by the transformation.

Based on the comparative analysis of 13 different European cities which pioneered digital transformation and restored spectacular economic growth, this forum produced a blueprint that identifies four main attributes through which stakeholders can truly help their cities and regions to go digital:

- Leadership and collaboration for a smart governance of the local digital ecosystem;
- Digital talent and entrepreneurs to accelerate the digital transformation process;

- Access to data and technologies for applied solutions to local challenges;
- Key Infrastructures and investments for digital launch-pads.

This focus on digital technologies is distinct from other potential levers of transformation in urban areas, such as political, social, cultural and economic - although there are and may be complementarities between them, or even specific aspects related to the compacting of the urban form of the cities and the events of their expansion (Ahfeldt and Pietrostefani, 2017) .

The following technologies are currently associated with this digital transformation process (Alawadhi et al., 2012) :

- Analytical tools and applications, including "Big Data";
- Mobile tools and applications;
- Platforms on which we build and share digital capabilities;
- Social tools and applications;
- The Internet of Things (IoT), which include connected devices and smart grids.

These technologies together, often globally designated as Internet of Everything (IoE), are having a profound impact on cities transformation leading to the vision of the city as a platform, as we shall see below.

In fact, with the digital transformation, information will be the lever for changing the cities planning and management models, since a city that is better known is better managed, being a matter that is transversal to all the strategic domains of the city, from economy to social inclusion, from environment to urban regeneration, from risk management and prevention to urban-rural integration.

2.2. City as a Platform

The process of digital transformation that leads to the construction of the smart city is gradual, going through an evolutionary four stages process presented below (Telefonica, 2016) where in our opinion the city as a platform will emerge in the end.

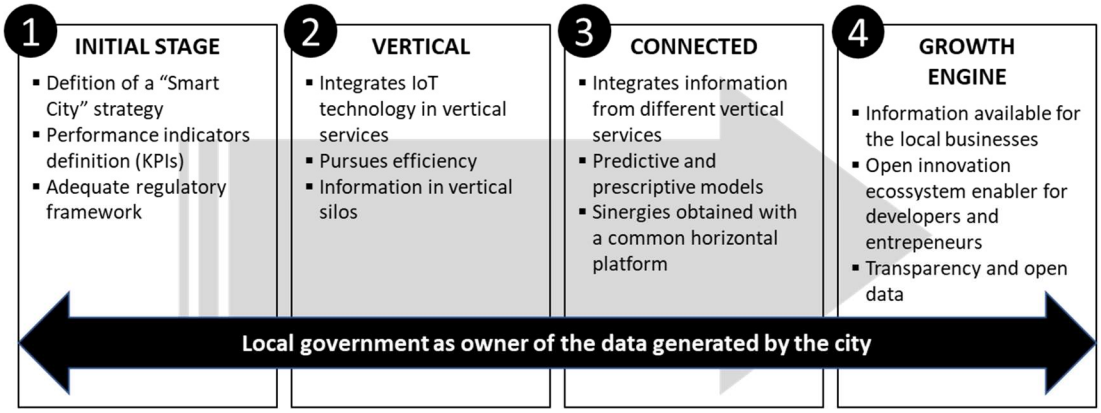

Figure 2: Smart City evolution (Telefonica, 2016)

According to this smart city evolution process, after an initial stage where a strategy is defined the cities will undergo a moment where different vertical initiatives will be developed (e.g. urban waste management, smart parking, public lighting, etc.). This will be a challenging stage since there is a real risk of creating information silos that will compromise the next evolution stages.

If the necessary conditions are present, the city can evolve to the third and connected stage where all the vertical projects will be linked together, data will flow transparently across the smart city infrastructure and urban intelligence can play its role in planning and managing the city creating the opportunity to move to the fourth stage where this capabilities and data are made available to the city stakeholders and value is created by new products and services that can boost economic growth.

It is in this context that we believe cities digital transformation will lead to the materialization of the city as a platform vision. In fact, cities can now use four asset classes, or tools - people, data, infrastructure and technologies - which can each interact in more fluid, synergistic ways than before and the convergence of these factors, among others, is prompting many people to begin to think about cities not just as places, but as platforms (Bollier, 2016).

In the report "Smart Cities - The city as a platform for Digital Transformation" (Telefonica, 2016), cities as a 'platform' should facilitate synergies, ensure interoperability with other services and promote innovation from open platforms and establishing a single digital market applications and services for citizens, businesses and visitors.

In this context of the city digital transformation that will support the evolutionary process referred above leading to the city as a platform we present below (figure 3) a proposal for a possible conceptual model of the smart city as a platform.

This approach sees the city as a platform that provides access to (open) data services and urban analytics based on collected or linked data and the Internet of Everything, to support three types of different functions: city planning and management by the municipality; development of products

and services by entrepreneurs and companies; and provision of information and services to the citizen.

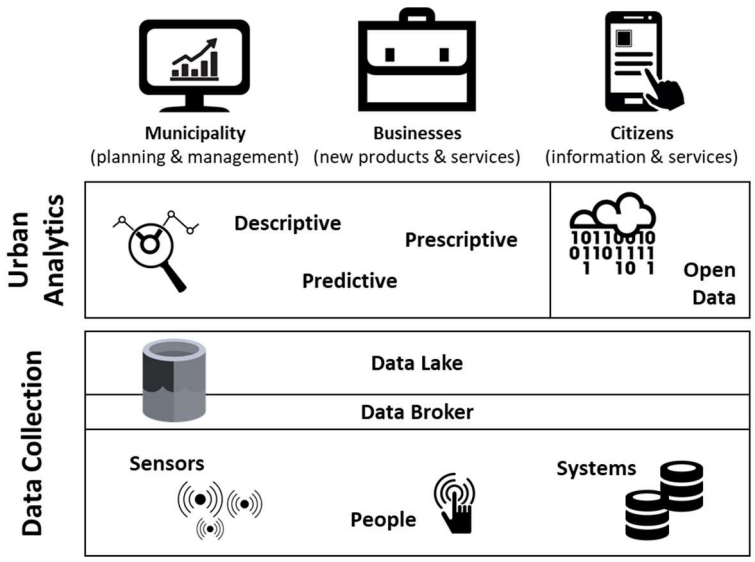

Figure 3: Smart City as a Platform

Thus, a fundamental point for the evolution of this concept is the establishment of a single and open infrastructure based on a horizontal platform standard. One example comes from the European Union that created the FIWARE (2016) platform, developed from the initiative "Future Internet" , whose objective was to create an open ecosystem where it facilitated the creation and delivery of digital applications and services in different sectors at a reduced cost. This platform is already used in many European cities and is a middleware has an open API, in which it seeks to have the involvement of both users and those who do development, makes a standard platform with reusable solutions.

Nevertheless, digital transformation brings deep implications to city governance models (Bollier, 2016), urban dwellers live their lives hyperlinked to numerous virtual spaces, the pulse of information in real time, with intelligent devices, remote access to databases and forms of participation in crowdsourcing and in this way, governance is no longer just the exercise of going to elections and manage the local authority to include the collection and information management from the citizens and from other sources, enriching the decision-making process with multiple layers of interaction, synergies, involvement and participation.

In this context is extremely relevant to refer the City as a Platform Manifesto[1] where is shared a common desire to improve the quality of life for people and the planet, knit local communities closer together, and offer a new economic agenda for local governments by using digital platforms. The

[1] https://www.tmforum.org/smart-city-forum/city-platform-manifesto/

responsible for the manifesto believe that, by itself, technology will not solve the challenges facing cities around the world since we need a shared collaborative framework between residents, the public and private sector to drive the desired outcome of sustainability, inclusivity and targeted innovation that benefits cities and their residents.

With this mindset and understanding, adapting and applying platform business model principles, they defend that cities can become regional or global knowledge hubs and innovation centres. Furthermore, cities that follow this path will become better places to live and be better equipped to manage urban challenges – with more insight, precision and transparency - since they will attract talent, create jobs and unleash innovation.

The City as a Platform Manifesto drives this future by adhering to the following principles when deploying city platforms managing the vast reservoir of data offered by sensor networks, enterprises, city agencies and residents:

1. City platforms must enable services that improve the quality of life in cities; benefitting residents, the environment, and helping to bridge the digital divide;
2. City platforms must bring together both public and private stakeholders in digital ecosystems;
3. City platforms must support sharing economy principles and the circular economy agenda;
4. City platforms must provide ways for local start-ups and businesses to innovate and thrive;
5. City platforms must enforce the privacy and security of confidential data;
6. City platforms must inform political decisions and offer mechanisms for residents to make their voices heard;
7. City platforms must involve the local government in their governance and curation, and are built and managed by the most competent and merited organisations;
8. City platforms must be based on open standards, industry best practices and open APIs to facilitate a vendor neutral approach, with industry agreed architecture models;
9. City platforms must support a common approach to federation of data or services between cities, making it possible for cities of all sizes to take part in the growing data economy;
10. City platforms must support the principles of UN Sustainable Development Goal 11: Making cities and human settlements inclusive, safe, resilient and sustainable.

3. URBAN INTELLIGENCE

If the city evolution went through the above referred process and we are in the context of the city as a platform we can say that the necessary conditions are present to support what in fact we consider urban intelligence, which is only possible by an holistic and orchestrated augmented smart city approach.

In fact, the presence of the above referred signpost of a smart city don't automatically imply we are in a city where we have urban intelligence leading the planning and operational decisions.

Urban intelligence in our vision is much more than the efficient and optimized management of the different verticals which characterize the above referred third stage in smart cities evolution. In fact it is when we reach the connected city stage, where data and systems are fully integrated, that we have the opportunity to take full advantage of data science and big data to take city governance to a higher level of intelligence and to see urban analytics deliver their true value.

Using as an example public lighting we can think about a smart vertical solution vs a intelligent city solution. In the first (using a vertical approach and often referred as smart city best pratice) we will take advantage of environmental sensors and traffic motion detectors to optimize public lighting management and the decision of switching lights on and off altogether with the light intensity will result from optimization models using the referred data sources. In the latter and in a urban intelligence approach, if we can take advantage of the city as a platform approach, the public lighting system planning and management will use not only the environmental sensors and traffic motion detectors to optimize public lighting management, but also real time data coming from other internal and external data sources. Amongst the examples we can present to illustrate this augmented smart city we can refer the use of data from other internal operational systems not related directly with the lighting system, e.g. automatically increase the illumination of a city square Friday evening from 18:00 until 24:00 because there is going to be held a pop-up market, or create dynamic connections with external systems that will influence public lighting, e.g., use real time data from the city emergency services or the police to adjust the lighting conditions in a specific moment and place as a reaction to accidents or crimes.

This is the real challenge we face today when it comes to create a real smart city - how can we build the city as a platform and take full advantage of the growing number of data sources by having an integrated and holistic approach to optimize urban planning and management using the potential of urban analytics and data science.

In this framework, real urban intelligence results from the possibilities created by the city as a platform approach and the integration of four asset classes, or tools - people, data, infrastructure and technologies - where the city governance is taken to a much higher level of efficiency translated into an augmented planning and management environment supported by big data and data science.

Going back to figure 3, we are in a stage where real time data integration in a city as a platform approach will support the three kinds of analytics: descriptive, predictive, and prescriptive making urban intelligence a critical and powerful leverage for city governance.

3.1. Urban Intelligence Building Blocks

In order to build urban intelligence that ensures resource usage efficiency and more sustainable and inclusive cities, and at the same time boost entrepreneurship and technological start-ups in the creation of innovative products and services for new markets, thus promoting economic development, there is an inescapable challenge that we must overcome.

This challenge is city data, true fuel of urban intelligence that should collected or linked and released in the form of open data - data that can be used, modified, and shared by anyone for any purpose.

According to OECD (2015), the data produced in cities can be divided into three categories:

- Flows – Cities are structured by and pervaded with different types of infrastructures (e.g. ICTs, transport, water, energy, waste networks) that facilitate movement and flows of resources, products, people and information across cities. Sensors embedded in urban infrastructures increasingly allow the digitisation and datafication of these flows.
- States – Urban inside spaces and outside environments are subject to constant natural and manmade changes. According to OCDE, the particular state of urban spaces and environments – the density of people, air temperature and quality, light and sound levels, etc. – is increasingly monitored by sensors, including cameras; through synoptic instruments such as satellites; or in continual observations from urban vantage points.
- Activities – Connected machines and devices used for both personal and professional activities in cities allow measurement of transaction, consumption and communication patterns. According to OCDE these patterns include in particular:
    1. People's activities, communication and interactions;
    2. Interaction between people and their environment;
    3. Interactions among components of their environments, such as communicating and autonomous machines and devices.

    Furthermore and of critical importance when we want to understand the city metabolism and its dynamics, interactions and transactions of individuals and businesses with public institutions (e.g. tax records, land use, sales, inventories, public health, crime records, school outcomes, workforce development), with businesses (e.g. credit card payments, consumption behaviour, sales records), and individuals (e.g. social networking) create transactional data on activities in cities.

Also in the context of urban intelligence the spatial dimension plays a fundamental role since these data, created through the sensing, measuring and recording of flows, states and activities in cities, can also be distinguished by the extent to which they are location specific:

- data produced by stationary sensors embedded in urban infrastructures and environments, mostly describing flows and states in cities;
- geo-locational and geo-referenced data generated in cities, often from mobile devices and sensors, describing mainly the activities (actions, interactions, transactions) of connected people, machines and devices;
- and other data generated in cities that do not necessarily have geographic properties, e.g. data on financial transactions.

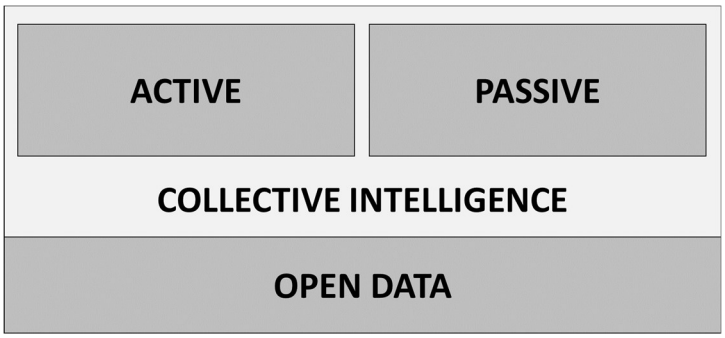

Figure 4: Urban Intelligence Building Blocks

In this sense, we can identify in this process of digital transformation of cities leading to the city as a platform, where data is the new raw material, a set of building blocks of urban intelligence, as shown schematically in the figure above and detailed below. On the one hand we have the open data with origin in the activity of the companies and collected from the sensors that they have to support their business or in the transactions that they carry out, on the other hand we have as data source the collective intelligence, that is the citizens, which has gained increasing relevance and which can either result from data collected actively or passively from the actions of the citizens.

3.2. Open Data

An interesting aspect in this emerging class of smart cities is their evolution into data-opening initiatives. While the collection of mass data through sensors linked to a variety of physical infrastructures has always been a feature of the first generation of smart cities, the publication of such data as open data, or its integration with open data published by urban authorities in different aspects of management and life in the city, is a relatively recent phenomena (Ojo, Curry and Zeleti, 2015).

The ability to create, collect and process scattered data and make it available openly is the first and also the most ambitious and disruptive urban intelligence building block. Municipalities have a key

role here and an opportunity to unleash processes of open innovation, co-creation and collective intelligence where citizens, companies, management and academia, as well as the third sector, will create new products and services, many of them still unimaginable, of high value added and capable of generating new markets. It is up to the municipalities to take the first step and launch open data initiatives (supported, at first, by the internal data sources and their projects based on IoT).

Open data is "data that can be used, modified and shared by anyone for any purpose" (Open Data Handbook[2]).

The Full Open setting (Open Knowledge International, 2017) gives precise details about what this means. To summarize the most important:

- Availability and Access: the data must be available as a whole and have no more than a reasonable cost of reproduction, preferably downloaded over the internet. The data must also be available in a convenient and modifiable form;
- Reuse and Redistribution: Data must be provided in ways that enable reuse and redistribution, including combining with other data sets;
- Universal Participation: Everyone should be able to use, reuse and distribute - there should be no discrimination in the fields of action or against individuals or groups. For example, "non-commercial" restrictions that would prevent "commercial" use, or restrictions of use for certain purposes (eg, education only), are not permitted.

The need for clarity about what it means to be open is closely related to interoperability. Interoperability is key to achieving the key benefits of data openness: drastic increase in the ability to combine different datasets together and the generation of new or better products and services (Khatoun and Zeadally, 2016) .

Open data has increasingly been seen as a defining element of smart cities and as such can be conceptually considered as a smart cities initiative, and it is important now to understand how open data initiatives impact the context of smart cities, as well as that smart city programs condition the associated open data initiatives.

By opening data on the environment, transport, education, health and so forth, municipalities can objectively support companies, start-ups, application developers, civil society organizations, among others, to find new and ways of dealing with urban problems .

Open data, not only governmental but also private companies open data, is an extraordinary and yet largely unexplored resource. While many organizations and individuals collect large amounts of

[2] http://opendatahandbook.org/

data, government has a particularly significant role here, not only because of the quantity and relevance of the data it creates, collects and maintains, but especially because such data should by definition be public, since they were the result of government activity and as such should be available as open data.

Also private companies are becoming more important and relevant in this context since they are rapidly becoming the true repositories of relevant urban data.

In the case of urban intelligence, open data strategies allow cities to aspire to achieve four key objectives:

- Higher levels of transparency: allowing the citizen to understand, examine and question the action and decisions taken by the municipality requires information. The more open data becomes public, the more we encourage participation and improve the services we deliver;
- Citizens Engagement: to increase citizens' involvement in city development and services, in decision-making processes and in participatory debate, requires citizens to understand the context in which the municipality operates. Thus, giving citizens and their communities access to operational data from the municipality and, in particular, spatially relevant data (from their "neighbourhood") helps to encourage more active and informed participation;
- Service Improvement and Efficiency Gains: Providing open data will support and accelerate the sharing of data from the municipality and other entities with expected results in improving service and efficiency gains;
- Bost Economic Development: the release of data is now considered a "trigger" for the promotion of economic and community activity. Cities around the world have already found that the massive availability of open data enables local businesses and developers to create new applications, new products and services, opening the door to the emergence of new markets.

3.3. Collective Intelligence

Reality has showed that citizens engagement in cities governance is one of the most important trends in the construction of smart cities. This reality is also of paramount importance in the context of urban intelligence since citizens inputs are as we will show the most important building block in the city as a platform to foster urban intelligence.

The most relevant dimension of this citizens involvement as a urban intelligence building block is the so-called collective intelligence, which consists of adopting active or passive crowdsourcing processes, as we shall see, in order to better understand cities reality and at the same time create very efficient and effective mechanisms for collecting data.

3.2.1 Active

Active collective intelligence supports the possibility of taking advantage of citizens engagement through active participation using informal mechanisms fostered by social networks and information and communication technologies. In addition to collecting data that does not require an active contribution from citizens, there are currently a number of new processes and tools that allow citizens to choose how to contribute with data, namely event reporting tools and new data collection techniques.

Event Reporting Tools: Citizens have always had the possibility to make requests or make complaints, in most cases by telephone, in writing or at community meetings. However, this usually requires more time than the citizen is available to give and today there are a significant number of digital tools that make it easier and simpler for citizens to report occurrences adopting a “Fix my street” approach.

New data collection techniques: Traditionally, when we wanted to better understand some phenomenon that affected our citizens we would conduct an inquiry. These surveys, while having the virtue of being highly detailed, since they are planned and executed by specialists, do not give immediate answers and are too costly.

Thus, we have seen emerging new ways of collecting the opinion of citizens to incorporate in the planning and implementation of municipal policies, such as participatory budgets or ideas contests.

3.2.2 Passive

In this modality of collective intelligence use we take advantage of the sensing capacity leveraged by the data generated in a passive way by the citizens actions. Today we leave a digital trace of almost everything we do and respecting personal privacy through data anonymization we can generate extremely valuable insights about the city metabolism.

In this context, we can refer as an example how city governments can today use mobile phone metadata (location, nationality, model) or content published in social media and other forms of data available online to better understand citizens' behaviour, identify problem and create insights about potential solutions.

Citizens as sensors - The sheer number of people who live or work in cities and have mobile phones generate location data that is increasingly seen as a valuable resource for a wide range of purposes, from traffic modelling (people and/or vehicles), urban planning, management of interventions, public health policies, creation of business opportunities, etc.

Social media - Social media, and in particular social networks such as Facebook and Twitter, are increasingly viewed by governments as an relevant data source to opportunity to improve cities governance thanks to the increasing capacities to analyse feelings and quantify the "Value" of the

issuer of opinion, since we can know today and in real time in great detail the opinions and reactions of citizens.

4. CONCLUSIONS

In order for the urban intelligence vision to materialize, it is important to move from a logic of reactive urban management to a proactive logic, supported by its digital and knowledge-based transformation, broad data availability and constant updating of information. A cognitive city supported by urban intelligence in which planning and management is focused in providing quality of live to its citizens based on the empowerment of ICTs and advanced techniques of real-time data processing and analysis, in order to efficiently and sustainably operate the various subsystems that compete for life in cities. Urban intelligence generates efficiency, which contributes directly to the creation of more sustainable and resilient cities and to a better quality of life in an urban environment.

We defend that the construction of urban intelligence has as its foundations the digital transformation of the city and in the urban intelligence building blocks which will only succeed in a model of an intelligent city acting as a platform focused on the generation of knowledge, in the wide availability of data and in the permanent updating of the information, working in a collaborative network involving all the actors: government and local administration, companies, academia and citizens.

In this context we must refer the challenges we face today regarding personal data security and privacy, especially with the new Regulation (EU) 2016/679 of the European Parliament and of the Council of 27 April 2016 on the protection of natural persons with regard to the processing of personal data and on the free movement of such data. Although our vision of urban intelligence can coexist with the safeguard of the referred regulation by taking advantage of the data anonymization process, this will have to managed.

It is important to emphasize that the essential principles for an intelligent city will have to be to promote an increased transparency in governance, the generation of synergies with stakeholders (public administration, companies, academia and citizens), better quality of services on the part of the administration and service providers with a greater involvement and participation of citizens in governance and in the life of the city, together with the promotion of economic, social and environmental development, enabling citizens to establish themselves in a given territory, in a given community where fundamental requirements for their quality of life are guaranteed.

This last objective, economic development, is effectively the one that will ensure the sustainability of the solutions of urban intelligence found, because only by creating value and increasing the income of citizens and companies that coexist in urban areas will make it possible to succeed in the long term.

The transformation which is leading to the city as a platform concept is a real revolution and the challenge we face is the construction of this new analytical city today.

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